IN THE SPECIFICATION:

Please amend the Specification as follows:

~~METHOD AND DEVICE FOR THE PRODUCTION OF A PNEUMATIC TIRE RIM~~

Before Paragraph 1, please insert the following:

BACKGROUND AND SUMMARY

[0001] The present ~~invention~~ disclosure relates to a method of producing a weight-optimized pneumatic tire rim ~~according to the preamble of Claim 1~~ as well as to a device for implementing the method.

[0002] For producing ~~such~~ a pneumatic tire rim, it is known, for example, from German Patent Document DE-OS 26 47 464 to reduce the thickness of the outlet wall[[,]] ~~thus~~ and that of the tube section, while simultaneously extending the length, on a longitudinally welded cylindrical tube section, which is also called a tire~~,~~. This is done by pressing on at least one rotating pressure roller or drawing roller in correspondence with a tool lining, which results in partially different wall thicknesses over rotational symmetrical areas[[,]] and which wall thicknesses are defined by the function.

[0003] Thus, normally, the rim dish is welded together with the rim well in the area of a well base, for which the latter has to have a certain wall thickness.

[0004] Because of ~~the~~ required weight optimizations, the areas which, in contrast to the above-mentioned welding area, are subject to no special stress, should be constructed as thin as possible[[,]]. That is so that the original wall thickness ~~which~~, in the case of the finished pneumatic tire rim, exists only in the above-mentioned stressed areas, and is correspondingly reduced by extrusion molding.

[0005] However, this is connected with a number of ~~disadvantages~~problems. Thus, for example, several working steps are required for achieving the reduction of the wall thickness, which leads to relatively high manufacturing times and resulting high manufacturing costs.

[0006] In this case, it is a contributing factor that the edges of the flanks become "uneven" as a result of the extrusion[[,]] ~~thus~~or the drawing of the material[[;]] ~~that~~. That is, an edge is created which, in the broadest sense, is frayed and requires a finishing.

[0007] Particularly in view of the fact that such pneumatic tire rims are produced as serial products in large piece numbers, the above-mentioned ~~disadvantages~~ problems have a special significance.

[0008] ~~It is therefore an object of the present invention to further develop~~The present disclosure relates to a method of ~~the above-mentioned type~~producing a pneumatic tire rim such that ~~the~~ manufacturing times are shortened and a more cost-effective manufacturing therefore becomes possible.

[0009] ~~This object is achieved by means of a method which has the characteristics of Claim 1 as well as by means of a device having the characteristics of Claim 7.~~ Thus, the present disclosure includes a method of producing a weight-optimized pneumatic tire rim having rotationally-symmetrically partially different wall thickness. The steps include: providing a tube section having a first wall thickness and two end sides; leveling the first wall thickness starting from the two end sides over a defined rotationally-symmetrical area thereby forming two flanks by precontouring, each of the flanks having a second wall thickness, and pushing tolerance-caused excess material of the flanks into a well base zone between the two flanks; and contouring the flanks by pressure rolling while drawing each of the flanks toward an end area of each of the flanks and reducing the thickness of each of the flanks partially differently to predetermined measurements. The present disclosure also includes a device including a tool lining having one or more of a precontour and a contour, the tool lining having a first lining part and a second lining part, which lining parts are movable relative to one another in an axial direction.

[00010] As a result of ~~the~~ known manufacturing processes, the tube section used as ~~the~~ a blank has relatively large tolerances in its wall thickness which ~~so far~~, during the extrusion to a defined wall thickness of the flanks, ~~led~~ may lead to ~~the above-mentioned~~ unevenness of the edges.

[00011] ~~In contrast, by means of the new method~~In accordance with the present disclosure, an exact predefinable material volume is created which is available for ~~the~~ further machining of the flanks [[(]], including longitudinal drawing, contouring and bringing to a predefined wall thicknesses[[)]].

[00012] ~~In this case, the~~The longitudinal drawing, which is the result of ~~the possibly~~possible partial reduction of the wall thickness carried out by ~~means of~~ pressure rollers, is ~~preferably~~ limited by a stop which is provided in a surrounding manner at ~~the~~ a

surface area of the tool lining and on which the respective flank rests in ~~the~~ an end position, ~~thus~~ after ~~the~~ termination of the pressure rolling.

[00013] By ~~means of~~ the volume of the flanks, which is present in a defined manner after the pressure rolling, the length of the flanks after the termination of the deformation can also be determined while taking into account the desired wall thicknesses.

[00014] This allows not only a production of the rim well which is as precise as possible with respect to ~~the~~ desired measurements, but ~~the~~ subsequent trimming of the edges can also be eliminated because, in the case of each rim well to be produced as a serial product, the same flank volumes exist after the first process step.

[00015] The excess material, which results from the thickness tolerances, is pushed into the well base zone during the leveling of the wall thickness, where it leads to a thickening of the wall.

[00016] Thus, as the initial wall thickness of the tube section, a wall thickness can be selected which is less than the end wall thickness in the area of the well base zone whose end thickness is, in turn, obtained from the original wall thickness and the added tolerance material of the flanks.

[00017] According to ~~another idea of the invention~~an embodiment of the present disclosure, it is provided that, before the leveling of the wall thickness of the then still cylindrical wall section as an initial product, the ~~latter~~ cylindrical wall section is widened on ~~at least one, preferably however, on both~~one or more of the end sides.

[00018] In this case, the diameter of the cylindrical tube section is smaller than the largest outside diameter of the rim well to be produced by the subsequent machining steps, whereas the diameter of the tube section corresponds to the largest diameter of the rim well when the end-side widening is ~~eliminated~~terminated.

[00019] Since the material volume remains the same in each ~~case~~embodiment, in the case of a smaller diameter of the ~~used~~ tube section, a larger width or wall thickness of the tube section is ~~to be~~ provided ~~correspondingly~~.

[00020] The above-mentioned widening of the tube section has manufacturing-related advantages since, during the subsequent pressing for the contouring, an uncontrolled excursion of the end areas is prevented.

[00021] A device for implementing the above-described method is constructed such that, for receiving the cylindrical tube section, a two-part tool lining is provided ~~which~~. The

tool lining is contoured at its outer surface area, the two tool lining parts being axially movable relative to one another.

[00022] ~~Additional advantageous embodiments of the method as well as of the device are characterized in the subclaims.~~ DELETE THIS PARAGRAPH.

[00023] ~~The method according to the invention will be described again in the following by means of drawings which illustrate an embodiment of a device for implementing the method.~~ Other aspects of the present disclosure will become apparent from the following descriptions when considered in conjunction with the accompanying drawings.

Before Paragraph 24, please insert the following:

BRIEF DESCRIPTION OF THE DRAWINGS

[00024] Figures 1 and 2 are longitudinal sectional views ~~respectively~~ of a device for ~~implementing~~ producing a pneumatic tire rim illustrating a ~~first~~ process step[[:]], according to the present disclosure.

[00025] Figures 3 and 4 are ~~also~~ longitudinal sectional views ~~respectively~~ of another embodiment of a device for ~~respectively following~~producing a pneumatic rim and illustrating additional process steps[[:]], according to the present disclosure.

[00026] Figure 5 is a ~~schematic~~ longitudinal sectional view of another embodiment of a device for ~~implementing~~ producing a pneumatic tire rim and illustrating a ~~first~~ process step, according to the present disclosure.

Before Paragraph 27, please insert the following:

DETAILED DESCRIPTION

[00027] Figures 1 and 2 show a device for producing a weight-optimized pneumatic tire rim~~, in the case of which a~~. A rim well 1 with rotationally symmetrically partially different wall thicknesses is provided from a cylindrical tube section 1a~~, preferably~~. The tube section 1a may be made of steel, by ~~means of~~ cold forming~~, which rim~~. Rim well 1 is subsequently connected, ~~preferably~~ for example by ~~means of~~ welding, with a rim dish ~~which is~~ (not shown).

[00028] ~~This~~ The rim producing device has a tool lining 2 ~~consisting of~~including a first lining part 3 and a second lining part 4, which lining devices 3, 4 can be moved in ~~the~~ an axial direction relative to one another in a spring-loaded manner.

[00029] ~~The~~ A surface area of the tool lining 2 is provided with a precontour 5 ~~into the~~. A cylindrical tube section ~~1~~ 1a can be correspondingly pressed onto the precontour 5 by ~~means of~~ pressure ~~rollers/rolling~~rollers or rolling tools 8.

[00030] Figure 1 shows the start of ~~the~~ a process during which the cylindrical tube section 1a ~~rest~~ rests on ~~the~~ an exterior side against the tool lining 2.

[00031] Starting from ~~the~~ two end sides 13, 14 of the tube section 1a~~, by means of~~ and using the pressure rollers~~/rolling tools~~ 8, tolerance-caused excess material of a ~~respective defined~~ rotationally symmetrical area ~~forming~~ forms a flank 6~~, while leveling the wall~~. Wall thickness S1[[~~,~~]] is leveled and displaced in ~~the~~ an area of ~~the~~ a rim or well base zone 7 ~~from which, on~~. On both sides[[~~,~~]] of rim well base zone 7 the formed flanks 6 extend, with each flank 6 having the same wall thickness S2. ~~In this case, the well~~Well base zone 7, as well as the flanks 6, assume the shape predetermined by the precontour 5.

[00032] The tolerance-caused excess material leads to a thickening of a wall thickness S3 of the well base zone 7 with respect to the original wall ~~while, in~~thickness S1. In the area of the flanks 6, the ~~latter~~ wall thickness S1 is leveled to such an extent that it corresponds, for example, to ~~the~~ a lower tolerance measurement.

[00033] As an example, a thickness of ~~$3.5^{+}_{-}0.1$~~ 3.5 ± 0.1 ~~was indicated~~ as the initial wall thickness S1 of the tube cylinder 1a, ~~so that~~may result in the wall thickness S2 of the flanks 6 ~~is~~ being 3.4, while the wall thickness S3 of the well base zone 7 may be approximately 3.85. ~~Here, the~~The leveling of the wall thickness in the area of the flanks 6 has led to a thickening of the wall thickness S3 of well base zone 7 in comparison to the original ~~usage of material~~wall thickness S1.

[00034] In order to hold the tube section 1a in ~~the~~ an axial direction and in order to prevent ~~that~~ an axial drawing ~~takes~~ from taking place during ~~the~~ a rolling, the first lining part 3 ~~as well as the~~and second lining part 4 have a surrounding stop 9 ~~on which first the tube~~. Tube section 1a and, in the ~~further~~ course of the process, ~~the contoured well base~~rim well 1 are supported on ~~the~~ an end side by stop 9.

[00035] Corresponding to ~~the~~ a shortening of the length of the tube section 1a ~~taking place~~ by the ~~precontouring~~precontour 5, the second lining part 4 is loaded by ~~means of the~~a

spring force (not shown) until it reaches an end position 15, as ~~illustrated~~ suggested in Figure 1 by a broken line and as shown in Figure 2.

[00036] In ~~the following~~a process step, the flanks 6 are further contoured by a drawing toward the outside, as illustrated in Figure 3.

[00037] ~~Here, another~~Another tool lining 2a is shown ~~whose~~ in Figure 3. Tool lining 2a includes first and second lining ~~part~~ parts 3a and 4a, respectively, in comparison to the first and second lining ~~part~~ parts 3 and 4, respectively, ~~according to~~of Figures 1 and 2. First and second lining parts 3a and 3b have a changed and drawn course of ~~the~~ contour 5a. The phantom lines shown in Figure 3 represent the status of tube section 1a from the process step of Figures 1 and 2.

[00038] By ~~means of this~~the rim producing device shown in Fig. 3, which has at least one pressure roller~~/rolling tool~~ 8, ~~the respectively~~ different wall thicknesses of the flanks 6 can be produced.

[00039] While a longitudinal drawing is carried out, one of the two flanks ~~6~~6L, starting from the well base zone 7, is changed to a wall thickness S4 by ~~means of~~ the pressure roller~~/rolling device~~ 8 which presses from the inside toward the outside, and which wall thickness may, for example, be 2.6 ~~with reference~~ as compared to ~~the preceding~~ a previous measurement ~~data~~of 3.5 ± 0.1.

[00040] However, the opposite flank ~~6~~ 6R is drawn to such an extent that a rotationally symmetrical area with a wall thickness of also S4 = 2.6 and having another area with a wall thickness of S5 = 1.8 ~~is obtained within the flank 6~~.

[00041] On ~~the~~ an end side, ~~the~~ deformation of the flanks ~~6~~ 6L and 6R is limited by stops 9a, which are provided in a surrounding manner at the first and second lining ~~part~~ parts 3a and 4a, respectively, and each stop 9a form ~~the~~ an end of the contour 5a.

[00042] ~~The~~ A volume, which can be precisely determined beforehand by the leveling of the flanks ~~6~~6L and 6R, is ~~again~~ found in the axial dimension, which is greater in comparison, and in the partially reduced wall thickness.

[00043] ~~In each case, the~~A height of the rim well 1 and ~~the~~ wall thicknesses of the flanks ~~6~~ 6L and 6R can be precisely predefined.

[00044] In a subsequent further machining of the rim well 1, as illustrated in Figure 4, ~~the~~ end areas 16, 17 of the flanks 6 are finished by shaping rollers 10. In a known manner

~~known per se~~, surrounding rim flanges 11 and humps 12 are shaped on ~~in this case~~ and are used for receiving a tire (not shown).

[00045] A tool lining 2b is ~~also~~ provided ~~here, which consists of~~, as shown in Fig. 4. Tool lining 2b includes a first lining part 3b and a second lining part 4b, ~~which~~having, on ~~the~~ their exterior ~~side~~sides, are at least partially shaped to correspond to the contour of the rim well 1.

[00046] Figure 5 illustrates that the largest diameter of ~~the~~ lining parts 3, 4 in ~~the~~ a machining area 20 or in ~~the~~ a contact area with the tube section 1a, is larger than ~~the~~ an inside diameter of ~~this~~ tube section 1a, so that the tube section 1a, which at first is cylindrical, rests with its end edges 18, 19 against ~~the respectively~~ assigned precontour 5 of the lining parts 3, 4.

[00047] During an axial mutual application of the lining parts 3, 4, the end areas 16, 17of the tube section 1a are in each case deformed to a widening 1b.

[00048] As mentioned above, ~~the~~ further machining, that is, ~~the~~ contouring also in the end areas 16, 17, takes place by ~~means of~~ the pressure rollers ~~/ rolling tools~~ 8.

[00048.5] Although the present disclosure has been described and illustrated in detail, it is to be clearly understood that this is done by way of illustration and example only and is not to be taken by way of limitation. The scope of the present disclosure is to be limited only by the terms of the appended claims.

~~List of Reference Numbers~~

~~1 Rim well~~

~~1a tube section~~

~~1b widening~~

~~2 tool lining~~

~~2a tool lining~~

~~3 first lining part~~

~~3a first lining part~~

~~4 second lining part~~

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~~4a second lining part~~

~~5 precontour~~

~~5a contour~~

~~6 flank~~

~~7 rim well zone~~

~~8 pressure roller / rolling tool~~

~~9 stop~~

~~9a stop~~

~~10 forming roller~~

~~11 rim flange~~

~~12 hump~~